GENERAL MIDI GS

EG-101

GROOVEKEYBOARD

MIDI Implementation

Roland

■ MIDI implementation

Model EG-101 **Version 1.00 '98.10**

Section 1 Receive data

■ Channel Voice Messages

● Note off

Status	2nd byte	3rd byte
8nH	kkH	vvH
9nH	kkH	00H

n = MIDI channel number : 0H-FH (ch.1-ch.16)
kk = note number : 00H-7FH (0-127)
vv = note off velocity : 00H-7FH (0-127)

* Not received when Rx.NOTE MESSAGE = OFF (Initial value is ON) or when note number is outside limits.
* For Drum Parts, these messages are received when Rx.NOTE OFF = ON for each Instrument.
* The velocity values of Note Off messages are ignored.

● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
kk = note number : 00H-7FH (0-127)
vv = note on velocity : 01H-7FH (1-127)

* Not received when Rx.NOTE MESSAGE = OFF. (Initial value is ON)
* For Drum Parts, not received when Rx.NOTE ON = OFF for each Instrument.

● Polyphonic Key Pressure

Status	2nd byte	3rd byte
AnH	kkH	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
kk = note number : 00H-7FH (0-127)
vv = key pressure : 00H-7FH (0-127)

* Not received when Rx.POLY PRESSURE (PAf) = OFF. (Initial value is ON)
* The resulting effect is determined by System Exclusive messages. With the initial settings, there will be no effect.

● Control Change

* When Rx.CONTROL CHANGE = OFF, all control change messages except for Channel Mode messages will be ignored.
* The value specified by a Control Change message will not be reset even by a Program Change, etc.

❩ Bank Select (Controller number 0, 32)

Status	2nd byte	3rd byte
BnH	00H	mmH
BnH	20H	llH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
mm = Bank number MSB : 00H-7FH (0 - 127), Initial Value = 00H
ll = Bank number LSB : 00H - 03H (MAP), Initial Value = 00H

* Not received when Rx.BANK SELECT = OFF. (Power-on default value is ON.)
*Bank number LSB will be handled as 00H regardless of the received value. However, when sending Bank Select messages, you have to send both the MSB (mmH) and LSB (llH, the value should be 00H) together.
* Bank Select processing will be suspended until a Program Change message is received.

❩ Modulation (Controller number 1)

Status	2nd byte	3rd byte
BnH	01H	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Modulation depth : 00H-7FH (0-127)

* Not received when Rx.MODULATION = OFF. (Initial value is ON)
* The resulting effect is determined by System Exclusive messages. With the initial settings, this is Pitch Modulation Depth.

❩ Portamento Time (Controller number 5)

Status	2nd byte	3rd byte
BnH	05H	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Portamento Time : 00H-7FH (0-127), Initial value = 00H (0)

* This adjusts the rate of pitch change when Portamento is ON or when using the Portamento Control. A value of 0 results in the fastest change.

❩ Data Entry (Controller number 6, 38)

Status	2nd byte	3rd byte
BnH	06H	mmH
BnH	26H	llH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
mm, ll = the value of the parameter specified by RPN/NRPN
mm = MSB, ll = LSB

❩ Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Volume : 00H-7FH (0-127), Initial Value = 64H (100)

* Volume messages are used to adjust the volume balance of each Part.
* Not received when Rx.VOLUME = OFF. (Initial value is ON)

❩ Pan (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = pan : 00H-40H-7FH (Left-Center-Right), Initial Value = 40H (Center)

* The stereo position can be adjusted over 127 steps.
* For Rhythm Parts, this is a relative adjustment of each Instrument's pan setting.
* Not received when Rx.PANPOT = OFF. (Initial value is ON)

❩ Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Expression : 00H-7FH (0-127), Initial Value = 7FH (127)

* This adjusts the volume of a Part. It can be used independently from Volume messages. Expression messages are used for musical expression within a performance; e.g., expression pedal movements, crescendo and decrescendo.
* Not received when Rx.EXPRESSION = OFF. (Initial value is ON)

❩ Hold 1 (Controller number 64)

Status	2nd byte	3rd byte
BnH	40H	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Control value : 00H-7FH (0-127)

* Not received when Rx.HOLD1 = OFF. (Initial value is ON)

❩ Portamento (Controller number 65)

Status	2nd byte	3rd byte
BnH	41H	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Control value : 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

* Not received when Rx.PORTAMENTO = OFF. (Initial value is ON)

) Sostenuto (Controller number 66)

Status	2nd byte	3rd byte
BnH	42H	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Control value : 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

* Not received when Rx.SOSTENUTO = OFF. (Initial value is ON)

) Soft (Controller number 67)

Status	2nd byte	3rd byte
BnH	43H	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Control value : 00H-7FH (0-127) 0-63 = OFF, 64-127 = ON

* Not received when Rx.SOFT = OFF. (Initial value is ON)

) Portamento control (Controller number 84)

Status	2nd byte	3rd byte
BnH	54H	kkH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
kk = source note number : 00H-7FH (0-127)

* A Note-on received immediately after a Portamento Control message will change continuously in pitch, starting from the pitch of the Source Note Number.
* If a voice is already sounding for a note number identical to the Source Note Number, this voice will continue sounding (i.e., legato) and will, when the next Note-on is received, smoothly change to the pitch of that Note-on.
* The rate of the pitch change caused by Portamento Control is determined by the Portamento Time value.

Example 1.

On MIDI	Description	Result
90 3C 40	Note on C4	C4 on
B0 54 3C	Portamento Control from C4	no change
90 40 40	Note on E4	glide from C4 to E4
80 3C 40	Note off C4	no change
80 40 40	Note off E4	E4 off

Example 2.

On MIDI	Description	Result
B0 54 3C	Portamento Control from C4	no change
90 40 40	Note on E4	E4 is played with glide from C4 to E4
80 40 40	Note off E4	E4 off

) Effect 1 (Reverb Send Level) (Controller number 91)

Status	2nd byte	3rd byte
BnH	5BH	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Reverb Send Level : 00H-7FH (0-127), Initial Value = 28H (40)

* This message adjusts the Reverb Send Level of each Part.

) Effect 3 (Chorus Send Level) (Controller number 93)

Status	2nd byte	3rd byte
BnH	5DH	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Chorus Send Level : 00H-7FH (0-127), Initial Value = 00H (0)

* This message adjusts the Chorus Send Level of each Part.

) NRPN MSB/LSB (Controller number 99, 98)

Status	2nd byte	3rd byte
BnH	63H	mmH
BnH	62H	llH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
mm = upper byte of the parameter number specified by NRPN
ll = lower byte of the parameter number specified by NRPN

* NRPN can be received when Rx.NRPN = ON. "Rx.NRPN" is set to OFF by power-on reset
* The value set by NRPN will not be reset even if Program Change or Reset All Controllers is received.

"NRPN"

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used. On this unit, NRPN messages can be used to modify sound parameters etc
To use these messages, you must first use NRPN messages (Controller number 98 and 99, their order does not matter) to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an NRPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7FH) when you have finished setting the value of the desired parameter. Refer to Section 4. Supplementary material "Examples of actual MIDI messages" <Example 4> (page 11). On this unit, Data entry LSB (Controller number 38) of NRPN is ignored, so it is no problem to send Data entry MSB (Controller number 6) only (without Data entry LSB).

On the EG-101, NRPN can be used to modify the following parameters.

NRPN MSB	NRPN LSB	Data entry MSB	Function and range
01H	08H	mmH	Vibrato Rate (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	09H	mmH	Vibrato Depth (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	0AH	mmH	Vibrato Delay (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	20H	mmH	TVF Cutoff Frequency (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	21H	mmH	TVF Resonance (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	63H	mmH	TVF&TVA Envelope Attack Time (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	64H	mmH	TVF&TVA Envelope Decay Time (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	66H	mmH	TVF&TVA Envelope Release Time (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
18H	rrH	mmH	Drum Instrument Pitch Coarse (relative change) rr: Drum Instrument note number mm: 00H - 40H - 7FH (-64 - 0 - +63 semitone)
1AH	rrH	mmH	Drum Instrument TVA Level (absolute change) rr: Drum Instrument note number mm: 00H - 7FH (0 - max)
1CH	rrH	mmH	Drum Instrument Panpot (absolute change) rr: Drum Instrument note number mm: 00H, 01H - 40H - 7FH (random, left-center-right)
1DH	rrH	mmH	Drum Instrument Reverb Send Level (absolute change) rr: Drum Instrument note number mm: 00H - 7FH (0 - max)
1EH	rrH	mmH	Drum Instrument Chorus Send Level (absolute change) rr: Drum Instrument note number mm: 00H - 7FH (0 - max)

* Data entry LSB (llH) is ignored.
* Parameters marked "relative change" will change relative to the preset value(40H).
* Parameters marked "absolute change" will be set to the absolute value of the parameter, regardless of the preset value.

❩ RPN MSB/LSB (Controller number 101, 100)

Status	2nd byte	3rd byte
BnH	65H	mmH
BnH	64H	llH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
mm = upper byte of parameter number specified by RPN
ll = lower byte of parameter number specified by RPN

* Not received when Rx.RPN = OFF. (Initial value is ON)
* The value specified by RPN will not be reset even by messages such as Program Change or Reset All Controller.

****RPN****

The RPN (Registered Parameter Number) messages are expanded control changes, and each function of an RPN is described by the MIDI Standard.
To use these messages, you must first use RPN (Controller number 100 and 110, their order does not matter) to specify the parameter to be controlled, and then use Data Entry messages (Controller number 6, 38) to specify the value of the specified parameter. Once an RPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter. To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7FH) when you have finished setting the value of the desired parameter. Refer to Section 4. "Examples of actual MIDI messages" <Example 4> (page 11).

On the EG-101, RPN can be used to modify the following parameters.

RPN MSB	RPN LSB	Data entry MSB	Data entry LSB	Explanation
00H	00H	mmH	---	Pitch Bend Sensitivity mm: 00H-18H (0-24 semitones), Initial Value = 02H (2 semitones) ll: ignored (processed as 00H) specify up to 2 octaves in semitone steps
00H	01H	mmH	llH	Master Fine Tuning mm, ll: 00 00H - 40 00H - 7F 7FH (-100 - 0 - +99.99 cents), Initial Value = 40 00H (± 0 cent) Refer to 4. Supplementary material, "About tuning" (page 12).
00H	02H	mmH	---	Master Coarse Tuning mm: 28H-40H-58H (-24 - 0 - +24 semitones), Initial Value = 40H (±0 semitone) ll: ignored (processed as 00H)
7FH	7FH	---	---	RPN null Set condition where RPN and NRPN are unspecified. The data entry messages after set RPN null will be ignored. (No Data entry messages are required after RPN null). Settings already made will not change. mm, ll: ignored

● Program Change

Status	2nd byte
CnH	ppH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
pp = Program number : 00H-7FH (prog.1-prog.128)

* Not received when Rx.PROGRAM CHANGE = OFF. (Initial value is ON)
* After a Program Change message is received, the sound will change beginning with the next Note-on. Voices already sounding when the Program Change message was received will not be affected.
* For Drum Parts, Program Change message will not be received on lower byte of the bank numbers (the value of Control Number 0 is other than 0 (00H)).

● Channel Pressure

Status	2nd byte
DnH	vvH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
vv = Channel Pressure : 00H-7FH (0-127)

* Not received when Rx.CH PRESSURE (CAf) = OFF. (Initial value is ON)
* The resulting effect is determined by System Exclusive messages. With the initial settings there will be no effect.

● Pitch Bend Change

Status	2nd byte	3rd byte
EnH	llH	mmH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
mm, ll = Pitch Bend value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

* Not received when Rx.PITCH BEND = OFF. (Initial value is ON)
* The resulting effect is determined by System Exclusive messages. With the initial settings the effect is Pitch Bend.

■ Channel Mode Messages

● All Sounds Off (Controller number 120)

Status	2nd byte	3rd byte
BnH	78H	00H

n = MIDI channel number : 0H-FH (ch.1-ch.16)

* When this message is received, all currently-sounding notes on the corresponding channel will be turned off immediately.

● Reset All Controllers (Controller number 121)

Status	2nd byte	3rd byte
BnH	79H	00H

n = MIDI channel number : 0H-FH (ch.1-ch.16)

* When this message is received, the following controllers will be set to their reset values.

Controller	Reset value
Pitch Bend Change	±0 (center)
Polyphonic Key Pressure	0 (off)
Channel Pressure	0 (off)
Modulation	0 (off)
Expression	127 (max)
Hold 1	0 (off)
Portamento	0 (off)
Sostenuto	0 (off)
Soft	0 (off)

● Local On/Off (Controller number 122)

Status	2nd byte	3rd byte	
BnH	7AH	00H	(Local Off)
BnH	7AH	7FH	(Local On - Default Value)

n = MIDI channel number : 0H-FH (ch.1-ch.16)
This parameter affect all the parts

When Local Off message is received, the generation board is disconnected from the keyboard but the messages received via Midi are still recognized and played.

*Regardless of the set channel, this message is sent to all parts.

● All Notes Off (Controller number 123)

Status	2nd byte	3rd byte
BnH	7BH	00H

n = MIDI channel number : 0H-FH (ch.1-ch.16)

* When All Notes Off is received, all notes on the corresponding channel will be turned off. However if Hold 1 or Sostenuto is ON, the sound will be continued until these are turned off.

● OMNI OFF (Controller number 124)

Status	2nd byte	3rd byte
BnH	7CH	00H

n = MIDI channel number : 0H-FH (ch.1-ch.16)

* Omni Off is only recognize as "All Notes Off". Mode does not change.

● OMNI ON (Controller number 125)

Status	2nd byte	3rd byte
BnH	7DH	00H

n = MIDI channel number : 0H-FH (ch.1-ch.16)

* Omni On is only recognize as "All Notes Off". Mode does not change.

● MONO (Controller number 126)

Status	2nd byte	3rd byte
BnH	7EH	mmH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
mm = mono number : 00H-10H (0-16)

* The same processing will be carried out as when All Sounds Off and All Notes Off is received, and the corresponding channel will be set to Mode 4 (M = 1) regardless of the value of "mono number."

● POLY (Controller number 127)

Status	2nd byte	3rd byte
BnH	7FH	00H

n = MIDI channel number : 0H-FH (ch.1-ch.16)

* The same processing will be carried out as when All Sounds Off and All Notes Off is received, and the corresponding channel will be set to Mode 3.

■ System Realtime Message

● Active Sensing
Status
FEH

* When Active Sensing is received, the unit will begin monitoring the intervals of all further messages. While monitoring, if the interval between messages exceeds 420 ms, the same processing will be carried out as when All Sounds Off, All Notes Off and Reset All Controllers are received, and message interval monitoring will be halted.

❍ Sequencer Start
Status
FAH

* When "Sequencer Start" is received, the internal Recorder and/or the internal Arranger start according to the following table.

❍ Sequencer Stop
Status
FCH

* When "Sequencer Stop" is received, the internal Recorder and/or the internal arranger stop according to the following table.

❍ Timing Clock
Status
F8H

* When "Timing Clock" is received the internal recorder or the internal arranger is synchronized to an external clock according to the following table.

Sync RX	Response
Internal (Md1, Md4)	The Style or Song will neither start/stop nor follow the tempo of the external Timing Clock (F8) and "Start /Stop" (FA / FC) messages. Md1 = Local ON - Md4 = Local OFF
Auto Arranger (Md2, Md5)	The Arranger will Start/Stop on receiving FA/FC it will either follow its own internal BPM tempo or it will automatically synchronoze to the external BPM tempo, if F8 messages are received. Md2 = Local ON - Md5 = Local OFF
Auto Song (Md3, Md6)	The Song will Play/Stop on receiving FA/FC it will either follow its own internal BPM tempo or it will automatically synchronoze to the external BPM tempo, if F8 messages are received. Md3 = Local ON - Md6 = Local OFF

Section 2 Transmit data

■ Channel voice messages

● Note off

Status	2nd byte	3rd byte
9nH	kkH	00H

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=velocity : 00H (0)

● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
kk=note number : 00H - 7FH (0 - 127)
vv=velocity : 01H - 7FH (1 - 127)

● Control Change

❍ Bank Select (Controller number 0,32)

Status	2nd byte	3rd byte
BnH	00H	mmH
BnH	20H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm=Bank number MSB : 00H - 7FH (0 - 127)

ll=Bank number LSB :00H - 02H (MAP)

❍ Modulation (Controller number 1)

Status	2nd byte	3rd byte
BnH	01H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Modulation depth : 00H - 7FH (0 - 127)

❍ Portamento Time (Controller number 5)

Status	2nd byte	3rd byte
BnH	05H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Portamento Time : 00H - 7FH (0 - 127) Initial value = 00H (0)

* This adjusts the rate of pitch change when Portamento is on or when using the Portamento Control. A value of 0 results in the fastest change.

❍ Data Entry (Controller number 6,38)

Status	2nd byte	3rd byte
BnH	06H	mmH
BnH	26H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm,ll= the value of the parameter specified by RPN/NRPN

❍ Pan (Controller number 10)

Status	2nd byte	3rd byte
BnH	0AH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=pan : 00H - 40H - 7FH
(Left - Center - Right) Initial value = 40H (Center)

* The stereo position can be adjusted over 127 steps.

❍ Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Expression : 00H - 7FH (0 - 127) Initial value = 7FH (127)

❍ Hold 1 (Controller number 64)

Status	2nd byte	3rd byte
BnH	40H	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) 0-63=OFF 64-127=ON

❍ Effect 1 (Reverb Send Level) (Controller number 91)

Status	2nd byte	3rd byte
BnH	5BH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) Initial value = 28H (40)

❩ **Effect 3 (Chorus Send Level)** **(Controller number 93)**

Status	2nd byte	3rd byte
BnH	5DH	vvH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
vv=Control value : 00H - 7FH (0 - 127) Initial value = 00H (0)

❩ **NRPN MSB/LSB** **(Controller number 99,98)**

Status	2nd byte	3rd byte
BnH	63H	mmH
BnH	62H	llH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
mm=upper byte of the parameter number specified by NRPN
ll=lower byte of the parameter number specified by NRPN

NRPN

The NRPN (Non Registered Parameter Number) message allows an extended range of control changes to be used, letting you use control functions which are not defined in the MIDI Specification.

NRPNs provide a great deal of freedom, and can be used with any manufacturer's devices. As a result, any particular parameter number can easily mean one thing when used for a certain device, and mean something completely different on another device.

Note that RPNs and NRPNs require that a multiple number of messages be processed in the correct order. However, a majority of the sequencers currently on the market cannot always be relied on to consistently send messages in the proper order if the messages are located at almost exactly the same point in time.

On the EG-101 instruments, NRPN can be used to modify the following parameters.

NRPN MSB	NRPN LSB	Data entry MSB	Function and range
01H	20H	mmH	TVF Cutoff Frequency (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)
01H	21H	mmH	TVF Resonance (relative change) mm: 00H - 40H - 7FH (-64 - 0 - +63)

● **Program Change**

Status	2nd byte
CnH	ppH

n=MIDI channel number : 0H - FH (ch.1 - ch.16)
pp=Program number : 00H - 7FH (prog.1 - prog.128)

● **Pitch Bend Change**

Status	2nd byte	3rd byte
EnH	llH	mmH

n = MIDI channel number : 0H-FH (ch.1-ch.16)
mm, ll = Pitch Bend value : 00 00H - 40 00H - 7F 7FH (-8192 - 0 - +8191)

■ System Realtime Messages

❩ **Active Sensing**

Status
FEH

Transmitted about every 250ms.

❩ **Sequencer Start**

Status
FAH

* This message is transmitted when the internal sequencer is started.

❩ **Sequencer Stop**

Status
FCH

* This message is transmitted when the internal sequencer is stopped.

❩ **Timing Clock**

Status
F8H

■ System Exclusive Messages

Status	Data byte	Status
F0H	iiH, ddH, ...eeH	F7H

F0H : System Exclusive Message status
ii = ID number : an ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland's manufacturer ID is 41H.
ID numbers 7EH and 7FH are extensions of the MIDI standard: Universal Non-realtime Messages (7EH) and Universal Realtime Messages (7FH).
dd,...,ee = data : 00H - 7FH (0 - 127)
F7H : EOX (End Of Exclusive)

The System Exclusive Messages Transmitted and received by the EG-101 are:

● **Data transmission**

Section 3 Individual Parameter Transmission (Model ID= 00H 18H)

Individual Parameter Transmission transmits data (or requests data) for one parameter as one exclusive message (one packet of "F0 ..... F7").

In Individual Parameter Transmission, you must use the Address and Size listed in the following "Parameter Address Map". Addresses marked at "#" cannot be used as starting addresses.

● **Patch parameters**
○ **Patch common parameters**

Model ID= 00H 18H

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Descrip-tion
40 00 00	00 00 04	0018 - 07E8	MASTER TUNE	-100.0 - +100.0 (cent) Use nibblized data.	00 04 00 00	0 (cent)
40 00 01#						
40 00 02#						
40 00 03#						

* Refer to section 4. Supplementary material, "About tuning" (page 12).

40 00 04	00 00 01	00 - 7F	MASTER VOLUME	0 - 127 (= F0 7F 7F 04 01 00 vv F7)	7F	127
40 00 05	00 00 01	28 - 58	MASTER KEY-SHIFT	-24 - +24 (semitones)	40	0(semitones)
40 00 06	00 00 01	01 - 7F	MASTER PAN	-63 (LEFT) - +63 (RIGHT)	40	0 (CENTER)
40 01 30	00 00 01	00 - 07	REVERB MACRO	00: Room 1 01: Room 2 02: Room 3 03: Hall 1 04: Hall 2 05: Plate 06: Delay 07: Panning Delay	04	Hall 2
40 01 31	00 00 01	00 - 07	REVERB CHARACTER	0 - 7	04	4
40 01 32	00 00 01	00 - 07	REVERB PRE-LPF	0 - 7	00	0
40 01 33	00 00 01	00 - 7F	REVERB LEVEL	0 - 127	40	64
40 01 34	00 00 01	00 - 7F	REVERB TIME	0 - 127	40	64
40 01 35	00 00 01	00 - 7F	REVERB DELAY FEEDBACK	0 - 127	00	0
40 01 36	00 00 01	00 - 7F	REVERB SEND LEVEL TO CHORUS	0 - 127	00	0

* REVERB MACRO is a macro parameter that allows global setting of reverb parameters. When you select the reverb type with REVERB MACRO, each reverb parameter will be set to the most suitable value.
* REVERB CHARACTER is a parameter that changes the reverb algorithm. The value of REVERB CHARACTER corresponds to the REVERB MACRO of the same number.

40 01 38	00 00 01	00 - 07	CHORUS MACRO	00: Chorus 1 01: Chorus 2 02: Chorus 3 03: Chorus 4 04: Feedback Chorus 05: Flanger 06: Short Delay 07: Short Delay(FB)	02	Chorus 3
40 01 39	00 00 01	00 - 07	CHORUS PRE-LPF	0-7	00	0
40 01 3A	00 00 01	00 - 7F	CHORUS LEVEL	0-127	40	64
40 01 3B	00 00 01	00 - 7F	CHORUS FEEDBACK	0-127	08	8
40 01 3C	00 00 01	00 - 7F	CHORUS DELAY	0-127	50	80
40 01 3D	00 00 01	00 - 7F	CHORUS RATE	0-127	03	3
40 01 3E	00 00 01	00 - 7F	CHORUS DEPTH	0-127	13	19
40 01 3F	00 00 01	00 - 7F	CHORUS SEND LEVEL TO REVERB	0-127	00	0

* CHORUS MACRO is a macro parameter that allows global setting of chorus parameters. When you use CHORUS MACRO to select the chorus type, each chorus parameter will be set to the most suitable value.

The relation between Part number and Block number is as follows.

x...BLOCK NUMBER (0 - F).

Part 1	(default MIDIch = 1)	x=1
Part 2	(default MIDIch = 2)	x=2
:	:	:
Part 9	(default MIDIch = 9)	x=9
Part10	(default MIDIch =10)	x=0
Part11	(default MIDIch =11)	x=A
Part12	(default MIDIch =12)	x=B
:	:	:
Part16	(default MIDIch =16)	x=F

n... MIDI channel number (0 - F) of the BLOCK.

In the following map, the control numbers of the control changes are indicated as CC#.

40 1x 00	00 00 02	00 - 7F	TONE NUMBER	CC#00 VALUE 0 - 127	00	0
40 1x 01#		00 - 7F		P.C. VALUE 1 - 128	00	1
40 1x 02	00 00 01	00 - 10	Rx. CHANNEL	1 - 16, OFF		Same as the Part Number
40 1x 03	00 00 01	00 - 01	Rx. PITCH BEND	OFF / ON	01	ON
40 1x 04	00 00 01	00 - 01	Rx. CH PRESSURE(CAf)	OFF / ON	01	ON
40 1x 05	00 00 01	00 - 01	Rx. PROGRAM CHANGE	OFF / ON	01	ON
40 1x 06	00 00 01	00 - 01	Rx. CONTROL CHANGE	OFF / ON	01	ON
40 1x 07	00 00 01	00 - 01	Rx. POLY PRESSURE(PAf)	OFF / ON	01	ON
40 1x 08	00 00 01	00 - 01	Rx. NOTE MESSAGE	OFF / ON	01	ON
40 1x 09	00 00 01	00 - 01	Rx. RPN	OFF / ON	01	ON
40 1x 0A	00 00 01	00 - 01	Rx. NRPN	OFF / ON	00	OFF
40 1x 0B	00 00 01	00 - 01	Rx. MODULATION	OFF / ON	01	ON
40 1x 0C	00 00 01	00 - 01	Rx. VOLUME	OFF / ON	01	ON
40 1x 0D	00 00 01	00 - 01	Rx. PANPOT	OFF / ON	01	ON
40 1x 0E	00 00 01	00 - 01	Rx. EXPRESSION	OFF / ON	01	ON
40 1x 0F	00 00 01	00 - 01	Rx. HOLD1	OFF / ON	01	ON
40 1x 10	00 00 01	00 - 01	Rx. PORTAMENTO	OFF / ON	01	ON
40 1x 11	00 00 01	00 - 01	Rx. SOSTENUTO	OFF / ON	01	ON
40 1x 12	00 00 01	00 - 01	Rx. SOFT	OFF / ON	01	ON

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 1x 13	00 00 01	00 - 01	MONO/POLY MODE	Mono / Poly (=CC# 126 01 / CC# 127 00)	01	Poly
40 1x 14	00 00 01	00 - 02	ASSIGN MODE	0 = SINGLE 1 = LIMITED-MULTI 2 = FULL-MULTI		

* ASSIGN MODE is the parameter that determines how voice assignment will be handled when sounds overlap on identical note numbers in the same channel (i.e., repeatedly struck notes). This is initialized to a mode suitable for each Part, so for general purposes there is no need to change this.

40 1x 15	00 00 01	00 - 02	USE FOR RHYTHM PART	0 = OFF 1 = MAP1 2 = MAP2	00 at x-0 01 at x=0	OFF (Normal Part) MAP1 (Drum Part)

* This parameter sets the Drum Map of the Part used as the Drum Part. This unit can simultaneously (in different Parts) use up to two Drum Maps (MAP1, MAP2). With the initial settings, Part10 (MIDI CH=10, x=0) is set to MAP1 (1), and other Parts are set to normal instrumental Parts (OFF(0)).

40 1x 16	00 00 01	28 - 58	PITCH KEY SHIFT	-24 - +24 (semitones)	40	0 (semitones)
40 1x 17	00 00 02	08 - F8	PITCH OFFSET FINE	-12.0 - +12.0 (Hz) Use nibblized data.	08 00	0 (Hz)
40 1x 18#						

* PITCH OFFSET FINE allows you to alter, by a specified frequency amount, the pitch at which notes will sound. This parameter differs from the conventional Fine Tuning (RPN #1) parameter in that the amount of frequency alteration (in Hertz) will be identical no matter which note is played. When a multiple number of Parts, each of which has been given a different setting for PITCH OFFSET FINE, are sounded by means of an identical note number, you can obtain a Celeste effect.

40 1x 19	00 00 01	00 - 7F	PART LEVEL	0 - 127 (=CC# 7)	64	100
40 1x 1A	00 00 01	00 - 7F	VELOCITY SENSE DEPTH	0 - 127	40	64
40 1x 1B	00 00 01	00 - 7F	VELOCITY SENSE OFFSET	0 - 127	40	64
40 1x 1C	00 00 01	00 - 7F	PART PANPOT	-64(RANDOM), -63(LEFT) - +63(RIGHT) (=CC# 10, except RANDOM)	40	0 (CENTER)
40 1x 1D	00 00 01	00 - 7F	KEYBOARD RANGE LOW	(C-1) - (G9)	00	C-1
40 1x 1E	00 00 01	00 - 7F	KEYBOARD RANGE HIGH	(C-1) - (G9)	7F	G 9
40 1x 1F	00 00 01	00 - 5F	CC1 CONTROLLER NUMBER	0 - 95	10	16
40 1x 20	00 00 01	00 - 5F	CC2 CONTROLLER NUMBER	0 - 95	11	17
40 1x 21	00 00 01	00 - 7F	CHORUS SEND LEVEL	0 - 127 (=CC# 93)	00	0
40 1x 22	00 00 01	00 - 7F	REVERB SEND LEVEL	0 - 127 (=CC# 91)	28	40
40 1x 23	00 00 01	00 - 01	Rx.BANK SELECT	OFF / ON	01(00*)	ON(OFF*)
40 1x 30	00 00 01	00 - 7F	TONE MODIFY1 Vibrato Rate	-64 - +63 (=NRPN# 8)	40	0
40 1x 31	00 00 01	00 - 7F	TONE MODIFY2 Vibrato Depth	-64 - +63 (=NRPN# 9)	40	0
40 1x 32	00 00 01	00 - 7F	TONE MODIFY3 TVF Cutoff Freq.	-64 - +63 (=NRPN# 32)	40	0
40 1x 33	00 00 01	00 - 7F	TONE MODIFY4 TVF Resonance	-64 - +63 (=NRPN# 33)	40	0
40 1x 34	00 00 01	00 - 7F	TONE MODIFY5 TVF&TVA Env.attack	-64 - +63 (=NRPN# 99)	40	0
40 1x 35	00 00 01	00 - 7F	TONE MODIFY6 TVF&TVA Env.decay	-64 - +63 (=NRPN# 100)	40	0
40 1x 36	00 00 01	00 - 7F	TONE MODIFY7 TVF&TVA Env.release	-64 - +63 (=NRPN# 102)	40	0
40 1x 37	00 00 01	00 - 7F	TONE MODIFY8 Vibrato Delay	-64 - +63 (=NRPN# 10)	40	0
40 1x 40	00 00 0C	00 - 7F	SCALE TUNING C	-64 - +63 (cent)	40	0 (cent)
40 1x 41#		00 - 7F	SCALE TUNING C#	-64 - +63 (cent)	40	0 (cent)
40 1x 42#		00 - 7F	SCALE TUNING D	-64 - +63 (cent)	40	0 (cent)
40 1x 43#		00 - 7F	SCALE TUNING D#	-64 - +63 (cent)	40	0 (cent)
40 1x 44#		00 - 7F	SCALE TUNING E	-64 - +63 (cent)	40	0 (cent)
40 1x 45#		00 - 7F	SCALE TUNING F	-64 - +63 (cent)	40	0 (cent)
40 1x 46#		00 - 7F	SCALE TUNING F#	-64 - +63 (cent)	40	0 (cent)
40 1x 47#		00 - 7F	SCALE TUNING G	-64 - +63 (cent)	40	0 (cent)
40 1x 48#		00 - 7F	SCALE TUNING G#	-64 - +63 (cent)	40	0 (cent)
40 1x 49#		00 - 7F	SCALE TUNING A	-64 - +63 (cent)	40	0 (cent)
40 1x 4A#		00 - 7F	SCALE TUNING A#	-64 - +63 (cent)	40	0 (cent)
40 1x 4B#		00 - 7F	SCALE TUNING B	-64 - +63 (cent)	40	0 (cent)

* SCALE TUNING is a function that allows fine adjustment to the pitch of each note in the octave. The pitch of each identically-named note in all octaves will change simultaneously. A setting of ± 0 cent (40H) is equal temperament (page 12).

40 2x 00	00 00 01	28 - 58	MOD PITCH CONTROL	-24 - +24 (semitones)	40	0 (semitones)
40 2x 01	00 00 01	00 - 7F	MOD TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40	0 (cent)
40 2x 02	00 00 01	00 - 7F	MOD AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40	0 (%)
40 2x 03	00 00 01	00 - 7F	MOD LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
40 2x 04	00 00 01	00 - 7F	MOD LFO1 PITCH DEPTH	0 - 600 (cent)	0A	10 (cent)
40 2x 05	00 00 01	00 - 7F	MOD LFO1 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 06	00 00 01	00 - 7F	MOD LFO1 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
40 2x 07	00 00 01	00 - 7F	MOD LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
40 2x 08	00 00 01	00 - 7F	MOD LFO2 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 09	00 00 01	00 - 7F	MOD LFO2 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 0A	00 00 01	00 - 7F	MOD LFO2 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
40 2x 10	00 00 01	40 - 58	BEND PITCH CONTROL	0 - 24 (semitones)	42	2 (semitones)
40 2x 11	00 00 01	00 - 7F	BEND TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40	0 (cent)
40 2x 12	00 00 01	00 - 7F	BEND AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40	0 (%)
40 2x 13	00 00 01	00 - 7F	BEND LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
40 2x 14	00 00 01	00 - 7F	BEND LFO1 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 15	00 00 01	00 - 7F	BEND LFO1 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 16	00 00 01	00 - 7F	BEND LFO1 TVA DEPTH	0 - 100.0 (%)	00	0 (%)
40 2x 17	00 00 01	00 - 7F	BEND LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40	0 (Hz)
40 2x 18	00 00 01	00 - 7F	BEND LFO2 PITCH DEPTH	0 - 600 (cent)	00	0 (cent)
40 2x 19	00 00 01	00 - 7F	BEND LFO2 TVF DEPTH	0 - 2400 (cent)	00	0 (cent)
40 2x 1A	00 00 01	00 - 7F	BEND LFO2 TVA DEPTH	0 - 100.0 (%)	00	0 (%)

Address(H)	Size(H)	Data(H)	Parameter	Description	Default Value (H)	Description
40 2x 20	00 00 01	28 - 58		CAf PITCH CONTROL	-24 - +24 (semitones)	40 0 (semitones)
40 2x 21	00 00 01	00 - 7F		CAf TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40 0 (cent)
40 2x 22	00 00 01	00 - 7F		CAf AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40 0 (%)
40 2x 23	00 00 01	00 - 7F		CAf LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 24	00 00 01	00 - 7F		CAf LFO1 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 25	00 00 01	00 - 7F		CAf LFO1 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 26	00 00 01	00 - 7F		CAf LFO1 TVA DEPTH	0 - 100.0 (%)	00 0 (%)
40 2x 27	00 00 01	00 - 7F		CAf LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 28	00 00 01	00 - 7F		CAf LFO2 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 29	00 00 01	00 - 7F		CAf LFO2 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 2A	00 00 01	00 - 7F		CAf LFO2 TVA DEPTH	0 - 100.0 (%)	00 0 (%)
40 2x 30	00 00 01	28 - 58		PAf PITCH CONTROL	-24 - +24 (semitones)	40 0 (semitones)
40 2x 31	00 00 01	00 - 7F		PAf TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40 0 (cent)
40 2x 32	00 00 01	00 - 7F		PAf AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40 0 (%)
40 2x 33	00 00 01	00 - 7F		PAf LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 34	00 00 01	00 - 7F		PAf LFO1 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 35	00 00 01	00 - 7F		PAf LFO1 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 36	00 00 01	00 - 7F		PAf LFO1 TVA DEPTH	0 - 100.0 (%)	00 0 (%)
40 2x 37	00 00 01	00 - 7F		PAf LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 38	00 00 01	00 - 7F		PAf LFO2 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 39	00 00 01	00 - 7F		PAf LFO2 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 3A	00 00 01	00 - 7F		PAf LFO2 TVA DEPTH	0 - 100.0 (%)	00 0 (%)
40 2x 40	00 00 01	28 - 58		CC1 PITCH CONTROL	-24 - +24 (semitones)	40 0 (semitones)
40 2x 41	00 00 01	00 - 7F		CC1 TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40 0 (cent)
40 2x 42	00 00 01	00 - 7F		CC1 AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40 0 (%)
40 2x 43	00 00 01	00 - 7F		CC1 LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 44	00 00 01	00 - 7F		CC1 LFO1 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 45	00 00 01	00 - 7F		CC1 LFO1 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 46	00 00 01	00 - 7F		CC1 LFO1 TVA DEPTH	0 - 100.0 (%)	00 0 (%)
40 2x 47	00 00 01	00 - 7F		CC1 LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 48	00 00 01	00 - 7F		CC1 LFO2 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 49	00 00 01	00 - 7F		CC1 LFO2 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 4A	00 00 01	00 - 7F		CC1 LFO2 TVA DEPTH	0 - 100.0 (%)	00 0 (%)
40 2x 50	00 00 01	28 - 58		CC2 PITCH CONTROL	-24 - +24 (semitones)	40 0 (semitones)
40 2x 51	00 00 01	00 - 7F		CC2 TVF CUTOFF CONTROL	-9600 - +9600 (cent)	40 0 (cent)
40 2x 52	00 00 01	00 - 7F		CC2 AMPLITUDE CONTROL	-100.0 - +100.0 (%)	40 0 (%)
40 2x 53	00 00 01	00 - 7F		CC2 LFO1 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 54	00 00 01	00 - 7F		CC2 LFO1 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 55	00 00 01	00 - 7F		CC2 LFO1 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 56	00 00 01	00 - 7F		CC2 LFO1 TVA DEPTH	0 - 100.0 (%)	00 0 (%)
40 2x 57	00 00 01	00 - 7F		CC2 LFO2 RATE CONTROL	-10.0 - +10.0 (Hz)	40 0 (Hz)
40 2x 58	00 00 01	00 - 7F		CC2 LFO2 PITCH DEPTH	0 - 600 (cent)	00 0 (cent)
40 2x 59	00 00 01	00 - 7F		CC2 LFO2 TVF DEPTH	0 - 2400 (cent)	00 0 (cent)
40 2x 5A	00 00 01	00 - 7F		CC2 LFO2 TVA DEPTH	0 - 100.0 (%)	00 0 (%)

Section 4. Supplementary material

● Decimal and Hexadecimal table

(An 'H' is appended to the end of numbers in hexadecimal notation.)

In MIDI documentation, data values and addresses/sizes of exclusive messages etc. are expressed as hexadecimal values for each 7 bits.
The following table shows how these correspond to decimal numbers.

Dec.	Hex.	Dec.	Hex.	Dec.	Hex.	Dec.	Hex.
0	00H	32	20H	64	40H	96	60H
1	01H	33	21H	65	41H	97	61H
2	02H	34	22H	66	42H	98	62H
3	03H	35	23H	67	43H	99	63H
4	04H	36	24H	68	44H	100	64H
5	05H	37	25H	69	45H	101	65H
6	06H	38	26H	70	46H	102	66H
7	07H	39	27H	71	47H	103	67H
8	08H	40	28H	72	48H	104	68H
9	09H	41	29H	73	49H	105	69H
10	0AH	42	2AH	74	4AH	106	6AH
11	0BH	43	2BH	75	4BH	107	6BH
12	0CH	44	2CH	76	4CH	108	6CH
13	0DH	45	2DH	77	4DH	109	6DH
14	0EH	46	2EH	78	4EH	110	6EH
15	0FH	47	2FH	79	4FH	111	6FH
16	10H	48	30H	80	50H	112	70H
17	11H	49	31H	81	51H	113	71H
18	12H	50	32H	82	52H	114	72H
19	13H	51	33H	83	53H	115	73H
20	14H	52	34H	84	54H	116	74H
21	15H	53	35H	85	55H	117	75H
22	16H	54	36H	86	56H	118	76H
23	17H	55	37H	87	57H	119	77H
24	18H	56	38H	88	58H	120	78H
25	19H	57	39H	89	59H	121	79H
26	1AH	58	3AH	90	5AH	122	7AH
27	1BH	59	3BH	91	5BH	123	7BH
28	1CH	60	3CH	92	5CH	124	7CH
29	1DH	61	3DH	93	5DH	125	7DH
30	1EH	62	3EH	94	5EH	126	7EH
31	1FH	63	3FH	95	5FH	127	7FH

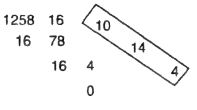
* Decimal values such as MIDI channel, bank select, and program change are listed as one greater than the values given in the above table.
* A 7-bit byte can express data in the range of 128 steps. For data where greater precision is required, we must use two or more bytes. For example, two hexadecimal numbers aa bbH expressing two 7-bit bytes would indicate a value of aa x 128+bb.
* In the case of values which have a ± sign, 00H = -64, 40H = ±0, and 7FH = +63, so that the decimal expression would be 64 less than the value given in the above chart. In the case of two types, 00 00H = -8192, 40 00H = ±0, and 7F 7FH = +8191. For example if aa bbH were expressed as decimal, this would be aa bbH - 40 00H = aa x 128+bb - 64 x 128.
* Data marked "Use nibbled data" is expressed in hexadecimal in 4-bit units. A value expressed as a 2-byte nibble 0a 0bH has the value of a x 16+b.

<Example 1> What is the decimal expression of 5AH ?
From the preceding table, 5AH = 90

<Example 2> What is the decimal expression of the value 12 34H given as hexadecimal for each 7 bits?
From the preceding table, since 12H = 18 and 34H = 52
18 x 128+52 = 2356

<Example 3> What is the decimal expression of the nibbled value 0A 03 09 0D ?
From the preceding table, since 0AH = 10, 03H = 3, 09H = 9, 0DH = 13
((10 x 16+3) x 16+9) x 16+13 = 41885

<Example 4> What is the nibbled expression of the decimal value 1258?



Since from the preceding table, 0 = 00H, 4 = 04H, 14 = 0EH, 10 = 0AH, the answer is 00 04 0E 0AH.

● Examples of actual MIDI messages

<Example 1> 92 3E 5F
9n is the Note-on status, and n is the MIDI channel number. Since 2H = 2, 3EH = 62, and 5FH = 95, this is a Note-on message with MIDI CH = 3, note number 62 (note name is D4), and velocity 95.

<Example 2> CE 49
CnH is the Program Change status, and n is the MIDI channel number. Since EH = 14 and 49H = 73, this is a Program Change message with MIDI CH = 15, program number 74 (Flute in GS).

<Example 3> EA 00 28
EnH is the Pitch Bend Change status, and n is the MIDI channel number. The 2nd byte (00H = 0) is the LSB and the 3rd byte (28H = 40) is the MSB, but Pitch Bend Value is a signed number in which 40 00H (= 64 x 12+80 = 8192) is 0, so this Pitch Bend Value is 28 00H - 40 00H = 40 x 12+80 - (64 x 12+80) = 5120 - 8192 = -3072

If the Pitch Bend Sensitivity is set to 2 semitones, -8192 (00 00H) will cause the pitch to change -200 cents, so in this case -200 x (-3072) ⁄ (-8192) = -75 cents of Pitch Bend is being applied to MIDI channel 11.

<Example 4> B3 64 00 65 00 06 0C 26 00 64 7F 65 7F
BnH is the Control Change status, and n is the MIDI channel number. For Control Changes, the 2nd byte is the control number, and the 3rd byte is the value. In a case in which two or more messages consecutive messages have the same status, MIDI has a provision called "running status" which allows the status byte of the second and following messages to be omitted. Thus, the above messages have the following meaning.

B3	64 00	MIDI ch.4, lower byte of RPN parameter number	: 00H
(B3)	65 00	(MIDI ch.4) upper byte of RPN parameter number	: 00H
(B3)	06 0C	(MIDI ch.4) upper byte of parameter value	: 0CH
(B3)	26 00	(MIDI ch.4) lower byte of parameter value	: 00H
(B3)	64 7F	(MIDI ch.4) lower byte of RPN parameter number	: 7FH
(B3)	65 7F	(MIDI ch.4) upper byte of RPN parameter number	: 7FH

In other words, the above messages specify a value of 0C 00H for RPN parameter number 00 00H on MIDI channel 4, and then set the RPN parameter number to 7F 7FH.

RPN parameter number 00 00H is Pitch Bend Sensitivity, and the MSB of the value indicates semitone units, so a value of 0CH = 12 sets the maximum pitch bend range to ±12 semitones (1 octave). (On GS sound sources the LSB of Pitch Bend Sensitivity is ignored, but the LSB should be transmitted anyway (with a value of 0) so that operation will be correct on any device.)

Once the parameter number has been specified for RPN or NRPN, all Data Entry messages transmitted on that same channel will be valid, so after the desired value has been transmitted, it is a good idea to set the parameter number to 7F 7FH to prevent accidents. This is the reason for the (B3) 64 7F (B3) 65 7F at the end.

It is not desirable for performance data (such as Standard MIDI File data) to contain many events with running status as given in <Example 4>. This is because if playback is halted during the song and then rewound or fast-forwarded, the sequencer may not be able to transmit the correct status, and the sounc source will then misinterpret the data. Take care to give each event its own status.

It is also necessary that the RPN or NRPN parameter number setting and the value setting be done in the proper order. On some sequencers, events occurring in the same (or consecutive) clock may be transmitted in an order different than the order in which they were received. For this reason it is a good idea to slightly skew the time of each event (about 1 tick for TPQN = 96, and about 5 ticks for TPQN = 480).

* TPQN: Ticks Per Quarter Note

● Example of an Exclusive message and calculating a Checksum

Roland Exclusive messages (RQ1, DT1) are transmitted with a checksum at the end (before F7) to make sure that the message was correctly received. The value of the checksum is determined by the address and data (or size) of the transmitted exclusive message.

◇ **How to calculate the checksum (hexadecimal numbers are indicated by 'H')**
The checksum is a value derived by adding the address, size and checksum itself and inverting the lower 7 bits.
Here's an example of how the checksum is calculated. We will assume that in the exclusive message we are transmitting, the address is aa bb ccH and the data or size is dd ee ffH.

aa+bb+cc+dd+ee+ff = sum
sum ⌊ 128 = quotient ... remainder
128 - remainder = checksum

<Example 1> Setting REVERB MACRO to ROOM 3
According to the "Parameter Address Map," the REVERB MACRO Address is 40 01 30H, and ROOM 3 is a value of 02H. Thus,

F0	41	10	42	12	40 01 30	02	??	F7
(1)	(2)	(3)	(4)	(5)	address	data	checksum	(6)

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17),
(4) Model ID (GS), (5) Command ID (DT1), (6) End of Exclusive

Next we calculate the checksum.

40H+01H+30H+02H = 64+1+48+2 = 115 (sum)
115 (sum) ⌊ 128 = 0 (quotient) ... 115 (remainder)
checksum = 128 - 115 (remainder) = 13 = 0DH

This means that F0 41 10 42 12 40 01 30 02 0D F7 is the message we transmit.

<Example 2> Requesting transmission of the LEVEL for DRUM MAP 1 NOTE NUMBER 75 (D#5; Claves)
NOTE NUMBER 75 (D#5) is 4BH in hexadecimal.
According to the "Parameter Address Map," LEVEL of NOTE NUMBER 75 (D#5; Claves) in DRUM MAP 1 has an Address of 41 02 4BH and a Size of 00 00 01H. Thus,

F0	41	10	42	11	41 02 4B	00 00 01	??	F7
(1)	(2)	(3)	(4)	(5)	address	size	checksum	(6)

(1) Exclusive Status, (2) ID (Roland), (3) Device ID (17),
(4) Model ID (GS), (5) Command ID(RQ1), (6) End of Exclusive

Next we calculate the checksum.

41H+02H+4BH+00H+00H+01H = 65+2+75+0+0+1 = 143 (sum)
143 (sum) ⌊ 128 = 1 (quotient) ... 15 (remainder)
checksum = 128 - 15 (remainder) = 113 = 71H

This means that F0 41 10 42 11 41 02 4B 00 00 01 71 F7 is the message we transmit.

● **About tuning**
In MIDI, individual Parts are tuned by sending RPN #1 (Master Fine Tuning) to the appropriate MIDI channel.
In MIDI, an entire device is tuned by either sending RPN #1 to all MIDI channels being used, or by sending a System Exclusive MASTER TUNE (address 40 00 00H).
RPN #1 allows tuning to be specified in steps of approximately 0.012 cents (to be precise, 100/8192 cent), and System Exclusive MASTER TUNE allows tuning in steps of 0.1 cent. One cent is 1/100th of a semitone.
The values of RPN #1 (Master Fine Tuning) and System Exclusive MASTER TUNE are added together to determine the actual pitch sounded by each Part.

Frequently used tuning values are given in the following table for your reference. Values are in hexadecimal (decimal in parentheses).

Hz at A41	cent	RPN #1	Sys.Ex. 40 00 00
445.0	+19.56	4C 43 (+1603)	00 04 0C 04 (+196)
444.0	+15.63	4A 03 (+1283)	00 04 09 0D (+157)
443.0	+11.76	47 44 (+ 964)	00 04 07 06 (+118)
442.0	+ 7.85	45 03 (+ 643)	00 04 04 01 (+ 79)
441.0	+ 3.93	42 42 (+ 322)	00 04 02 07 (+ 39)
440.0	0	40 00 (0)	00 04 00 00 (0)
439.0	- 3.94	3D 3D (- 323)	00 03 0D 09 (- 39)
438.0	- 7.89	3A 7A (- 646)	00 03 0B 01 (- 79)

<Example> Set the tuning of MIDI channel 3 to A4 = 442.0 Hz
Send RPN#1 to MIDI channel 3. From the above table, the value is 45 03H.

B2	64 00	MIDI ch.3, lower byte of RPN parameter number	: 00H
(B2)	65 01	(MIDI ch.3) upper byte of RPN parameter number	: 01H
(B2)	06 45	(MIDI ch.3) upper byte of parameter value	: 45H
(B2)	26 03	(MIDI ch.3) lower byte of parameter value	: 03H
(B2)	64 7F	(MIDI ch.3) lower byte of RPN parameter number	: 7FH
(B2)	65 7F	(MIDI ch.3) upper byte of RPN parameter number	: 7FH

● **The Scale Tune Feature (address: 40 1x 40)**
The scale Tune feature allows you to finely adjust the individual pitch of the notes from C through B. Though the settings are made while working with one octave, the fine adjustments will affect all octaves. By making the appropriate Scale Tune settings, you can obtain a complete variety of tuning methods other than equal temperament. As examples, three possible types of scale setting are explained below.

❍ **Equal Temperament**
This method of tuning divides the octave into 12 equal parts. It is currently the most widely used form of tuning,
especially in occidental music. On this unit, the default settings for the Scale Tune feature produce equal temperament

❍ **Just Temperament (Keytone C)**
The three main chords resound much more beautifully than with equal temperament, but this benefit can only be obtained in one key. If transposed, the chords tend to become ambiguous. The example given involves settings for a key in which C is the keynote.

❍ **Arabian Scale**
By altering the setting for Scale Tune, you can obtain a variety of other tunings suited for ethnic music. For example, the settings introduced below will set the unit to use the Arabian Scale.

Example Settings

Note name	Equal Temperament	Just Temperament (Keytone C)	Arabian Scale
C	0	0	-6
C#	0	-8	+45
D	0	+4	-2
D#	0	+16	-12
E	0	-14	-51
F	0	-2	-8
F#	0	-10	+43
G	0	+2	-4
G#	0	+14	+47
A	0	-16	0
A#	0	+14	-10
B	0	-12	-49

The values in the table are given in cents. Refer to the explanation of Scale Tuning on page 9 to convert these values to hexadecimal, and transmit them as exclusive data. For example, to set the tune (C-B) of the Part1 Arabian Scale, send the data as follows:
F0 41 10 42 12 40 11 40 3A 6D 3E 34 0D 38 6B 3C 6F 40 36 0F 76 F7

GROOVEKEYBOARD
Model : EG-101

MIDI Implementation Charts

Date : OCT 1998
Version : 1.00

Function		Transmitted	Recognized	Remarks
Basic	Default	1-2-3-4-5-7-8-9-10-11-16	1-14, 16	1=Acc1 2=Acc Bass 3=Acc2 4=Upper 5=Acc3 6=RX1 7=Acc4 8=Acc5 9=Acc6 10=Acc Drums/Stl PC 11=Sampler 12=RX2 13=RX3 14=Note To Arr.
Channel	Changed	×	×	
Mode	Default Message Altered	Mode 3 Mode 3, 4(M=1) *****	Mode 3 Mode 3, 4(M=1)	*2
Note Number	True Voice	0-127 *****	0-127 0-127	
Velocity	Note ON Note OFF	○ *1 ×	○ ×	
After Touch	Key's Ch's	× ×	○ ○	
Pitch Bend		○	○	
Control Change	0, 32 1 5 6, 38 7 10 11 64 65 66 67 84 91 93 98, 99 100,101	○ ○ ○ ○ × ○ ○ ○ ○ × × × ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ (Reverb) ○ (Chorus) ○ ○	Bank Select Modulation Portamento Time Data Entry Volume Panpot Expression Hold 1 Portamento Sostenuto Soft Portamento Control Effect 1 Depth Effect 3 Depth NRPN LSB,MSB RPN LSB,MSB
Program Change	True #	○ *****	○ 0-127	Program Number: 1-128
System Exclusive		○	○	
System Common	Song Pos Song Sel Tune	× × ×	× × ×	
System Real Time	Clock Commands	○ ○	○ ○	F8 FA, FC
Aux Messages	All Sounds Off Reset All Controllers Local On/Off All Notes Off Active Sense Reset	× × × × ○ ×	○ (120,126,127) ○ (121) ○ (122) ○ (123-125) ○ ×	
Notes		*1 ○ × is selectable. *2 Recognize as M=1 even if M ≠ 1		

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No

Roland®

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